POINT OF SALE DEVICE WITH CRADLE FOR COMPUTING DEVICE

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application claims priority to and is a continuation of U.S. patent application Ser. No. 16/588,491, filed on Sep. 30, 2019, entitled "POINT OF SALE DEVICE WITH CRADLE FOR MOBILE COMPUTING DEVICE," the entirety of which is herein incorporated by reference.

BACKGROUND

[0002] Payment cards, such as credit cards and debit cards, are often used by customers during transactions with merchants. Merchants can read payment information from payment cards using payment card reader devices. Payment card reader devices include magnetic stripe reader devices that read payment card information from a magnetic stripe of a payment card that is swiped through a slot, Europay/Mastercard/Visa (EMV) chip reader devices that read payment card information from an EMV chip of a payment card that is inserted into a slot, or near field communication (NFC) reader devices that read payment card information wirelessly from an NFC-enabled payment card. Payment card reader devices read the payment card from a payment card, then send that payment card information to a server associated with a financial entity, such as a bank or credit card institution, in order to process the transaction by transferring funds from a customer account to a merchant account.

[0003] Mobile computing devices, such as smartphones or tablet computers, are computing devices with a mobile and/or portable form factor. Mobile computing devices typically include a display screen and an input interface, such as a touchscreen touch interface of the display screen. Mobile computing devices are increasingly popular, but come in a wide range of different sizes and form factors. As a result, interfacing a particular mobile computing device with another device can be difficult, because while a bracket or other elements made for holding or otherwise securing a mobile computing device might be compatible with some mobile computing device form factors and sizes, it might not be compatible with all mobile computing device form factors and sizes. For example, manufacturers often change device thickness, size, ports, port locations, or other form factor elements from one version of a mobile computing device to the next, often meaning that a newer model of a mobile computing device breaks compatibility with an interface that an older version of the same mobile computing device worked well with.

[0004] Merchant point of sale (POS) devices are systems that are used by merchants to enter items or services requested by a customer, retrieve prices for each item or service, calculate a total, and in some cases prepare a receipt or invoice to be printed and given to the customer before or after payment processing.

[0005] There is a need for systems and methods for a secure payment processing system that flexibly and intuitively interfaces with a variety of mobile computing devices.

BRIEF DESCRIPTION OF THE DRAWINGS

[0006] FIG. **1**A illustrates a point of sale (POS) terminal device that holds and interfaces with a first mobile computing device that has a first form factor.

[0007] FIG. **1**B illustrates a point of sale (POS) terminal device that holds and interfaces with a second mobile computing device that has a second form factor.

[0008] FIG. **2** illustrates a point of sale (POS) terminal device with interchangeable frames for securing different mobile computing devices with different form factors.

[0009] FIG. **3** illustrates a system architecture including a merchant point of sale (POS) terminal device and a mobile computing device.

[0010] FIG. **4**A illustrates a latch of a frame of a point of sale (POS) terminal device from a perspective view.

[0011] FIG. **4**B illustrates the latch of the frame of point of sale (POS) terminal device from a side view.

[0012] FIG. **4**C illustrates the latch of the frame of the point of sale (POS) terminal device in a locked position securing a mobile computing device from a side view.

[0013] FIG. **4**D illustrates the latch of the frame of the point of sale (POS) terminal device in an unlocked position cradling a mobile computing device from a side view.

[0014] FIG. **4**E illustrates the latch of the frame of the point of sale (POS) terminal device in a receive/eject position from a side view.

[0015] FIG. **5** is a flow diagram illustrating operations of a point of sale (POS) terminal device with a removable frame.

[0016] FIG. **6**A illustrates a curved near field communication (NFC) antenna.

[0017] FIG. **6**B illustrates a curved near field communication (NFC) antenna alongside a payment card slot within the point of sale (POS) terminal device.

[0018] FIG. **6**C illustrates a second type of curved near field communication (NFC) antenna alongside a payment card slot within the point of sale (POS) terminal device.

[0019] FIG. **7**A illustrates an exploded view of a secure enclosure that encloses and connects to a circuit board.

[0020] FIG. **7**B illustrates an interior of a secure enclosure that encloses and connects to a circuit board.

[0021] FIG. **8**A illustrates a tamper detection system in which a flexible member with conductive traces is tightly wrapped around a secure component.

[0022] FIG. **8**B illustrates a tamper detection system in which a flexible member with conductive traces is tightly wrapped around a secure enclosure.

[0023] FIG. **9**A illustrates a flexible member used in a tamper detection system that detects tampering with a screw.

[0024] FIG. **9**B illustrates the screw, a recessed housing, and a conductive gasket that are also used in the tamper detection system that detects tampering with the screw.

[0025] FIG. **9**C illustrates an exploded side view of the tamper detection system that detects tampering with a screw.

[0026] FIG. **9**D illustrates a side view of the tamper detection system of FIG. **9**C in a secure state.

[0027] FIG. **9**E illustrates a side view of the tamper detection system of FIG. **9**D with a second solid housing element.

[0028] FIG. **10** illustrates a tamper detection system in which one or more flexible members with conductive traces bridge two circuit boards.

[0029] FIG. **11**A illustrates a chip card reader device with reader circuitry on either side of a slot.

[0030] FIG. **11**B illustrates a circuit diagram of a chip card reader device with reader circuitry on either side of a slot.

[0031] FIG. **12**A illustrates a tamper detection system with a housing and a circuit board in a secure state.